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| 09/924,315 | 08/07/2001 | Ralf Wolleschensky | GK-ZEI-3102 / 500343.2009 | 3593 |

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| EXAMINER |
|---|
| GAGLIARDI, ALBERT J |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2878 | |

DATE MAILED: 04/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/924,315 | WOLLESCHENSKY ET AL. | |
| | Examiner | Art Unit | |
| | Albert J. Gagliardi | 2878 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *07 August 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-87* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3,4,5* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

## DETAILED ACTION

### *Election/Restrictions*

1. The examiner notes that the claims appear to be directed to a multitude of different species of optical detection systems as well as numerous species of subcombinations (i.e., signal processing and focusing systems). The examiner considers that none of the claimed species appear to be critical to the invention as a whole and/or directed to patentably distinct inventions. As such, no restriction has been made. If applicant is of the opinion that any of the specific systems or sub-systems (such as digital versus analog processing subsystems) recited in any of the dependent claims are directed to patentably distinct inventions, applicant should so indicate in any response. If such arguments are convincing, further prosecution of the application will be restricted to a single elected species of applicants choosing and including any claims generic thereto. Presently the examiner considers independent claims 1 and 48 to be generic.

### *Claim Objections*

2. The examiner notes that, in general, the claims are written in a form that is generally narrative in nature as opposed to the more conventional form that is typically used for claims. While the examiner notes that no specific objections are being made, the applicant should carefully review such claims to insure they properly reflect applicant's invention.

### *Claim Rejections - 35 USC § 112*

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 6, 18, 19, 31, 58, 59, and 71 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 6, the expression "in combination with spectral centroid formation" is unclear.

Regarding claims 18 and 58, the claims recite the limitation "the detection channels". There is insufficient antecedent basis for this limitation in the claim.

Regarding claims 19and 59, the claims recite the limitation "the integration parameters". There is insufficient antecedent basis for this limitation in the claim. Claim 19 is also unclear because there is no indication of how the parameters are influenced.

Regarding claims 31 and 71, the claims recite the limitation "the photon counting". There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-87 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carlson *et al.* (US 6,038,023) in view of Trulson *et al.* (US 6,252,236 B1).

Regarding claim 1, *Carlson* discloses (Fig. 2, 4) an optical detection method including the steps of: splitting image information of a specimen into spectral components in a spatially resolved manner (43) and carrying out at least one summing for different spectral components (col. 4, lines 60-66).

Although *Carlson* does not specifically disclose that the method is used in a laser scanning microscope, *Carlson* does disclose that the system may be used in a variety of applications including imaging applications (col. 1, lines 17-34). *Trulson* discloses (Figs. 1-3) a typical optical imaging system arranged as a laser scanning microscope. *Carlson* teaches that the disclosed optical detection system allows for rapid reconfiguration of signals corresponding to different spectral bands (col. 1, lines 37-43). Therefore it would have been obvious to a person of ordinary skill in the art to modify the method suggested by *Carlson* for use in the operation of a laser scanning microscope to so as to allow for a scanning microscope that can be rapidly reconfigured to detect selected spectral bands.

Regarding claim 2, the method suggested by *Carlson* and *Trulson* as applied above suggests a method wherein at least one irradiation wavelength or intensity is carried out within a scanning process between different specimen regions and a summing of at least some of the spectral components is carried out for different specimen regions or irradiation wavelengths or

intensities (*Trulson* at col. 2, lines 32-65; col. 18, lines 43-58; and col. 25 line 60 to col. 26, line 30).

Regarding claim 3, the method suggested by *Carlson* and *Trulson* as applied above suggests the summed regions are displayed as images.

Regarding claim 4, absent some degree of criticality, the particular manner of forming the sums (i.e., by forming partial sums) would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the particular operating parameters desired.

Regarding claim 5 and 6, *Carlson* suggests an overlapping of partial sums containing the overlapped signals of different fluorescent components and the formation, as best understood, of spectral centroid formation for a plurality of spectral components.

Regarding claim 7, the use of a variety of mathematical operations including division and subtraction are well known for use in conjunction with spectral imaging and, absent some degree of criticality, the use of such operations would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the desired operational parameters.

Regarding claim 8, *Carson* suggests that the radiation is split spectrally by a dispersive element (43) and the at least one sum signal is determined electronically (see generally Figs. 6-8).

Regarding claims 9 and 10, the method suggested by *Carlson* and *Trulson* as applied above suggests the sum signal is determined for distinguishing different dyes (*Trulson* at col. col. 26, lines 43-48).

Regarding claims 11 and 12, varying the composition of the sum signals as a function of excitation parameters and/or the region of interest (i.e., multitracking and ROI tracking) is known in the art (see also applicant's specification at page 11) and, absent some degree of criticality, would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the desired operational parameters.

Regarding claim 13, *Carson* suggests that the emission radiation is split spectrally by a dispersive element (43) and is detected in a spatially resolved manner in at least one direction.

Regarding claim 14, *Carson* suggests that the radiation is fluorescence (abstract).

Regarding claim 15, *Carson* suggests that the reflected (col. 2, lines 33-40) radiation is split spectrally by a dispersive element (43) and is detected in a spatially resolved manner in at least one direction.

Regarding claims 16 and 17, a variety of functionally equivalent different types of processing (i.e., analog or digital) are known in the art and, absent some degree of criticality, would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the needs of the application.

Regarding claims 18, as best understood, nonlinear distortion of input signals is common among scanning systems and is considered as inherent aspect of such systems if not otherwise corrected or compensated for.

Regarding claim 19, as best understood, integration of input signals is common in the art. Additionally, it is well known and considered routine in the art to adjust the integration parameters depending on the needs of the particular application.

Regarding claim 20, the use of amplifiers in signal processing is common in the art. Additionally, it is well known and considered routine in the art to adjust the operational parameters of such amplifiers depending on the needs of the particular application.

Regarding claim 21, the method suggested by *Carlson* and *Trulson* as applied above suggests a method wherein the sum signals are used for generating an image.

Regarding claim 22, color-coded imaging is well known and would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the desired operational parameters.

Regarding claim 23, superposition of multiple images is well known and would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the desired operational parameters.

Regarding claims 24-25, the use of a lookup table in conjunction with optical detection of fluorescent species is well known and would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the desired operational parameters.

Regarding claim 26, comparison of a measured signal with a reference signal is well known in optical imaging applications and would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the desired operational parameters. Adjustment of the operating mode of the detection channel based upon the reference signal is also typical and would have been obvious design choice.

Regarding claims 27 and 28, *Carlson* discloses that respective detection channels are switched on or off as desired (see generally Figs. 6-8) so as to narrow the spectral region of interest.

Regarding claim 29 and 30, a variety of functionally equivalent different types of signal detection/processing (i.e., integration and photon counting) systems are known in the art and, absent some degree of criticality, would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the needs of the application.

Regarding claim 31, as best understood, *Carlson* discloses that he detection may be carried out in time correlation (col. 2, lines 37-40).

Regarding claims 32-33, *Carlson* discloses that the system may be used in a variety of optical detection applications including fluorescence detection applications (col. 1, lines 17-34). Applications such as single and multi-photon fluorescence applications and parallel illumination/detection of microtiter plates are well known. Absent some degree of criticality, the use of the suggested method in such applications would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the desired operational parameters.

Regarding claims 34-35, in the method suggested by *Carlson* and *Trulson* as applied above, *Trulson* suggests that the method is incorporated in a scanning microscope. Absent some degree of criticality, the type of microscope (i.e., a near-field microscope) would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the desired operational parameters.

Regarding claim 36, *Carlson* discloses that the system may be used in a variety of optical detection applications including fluorescence detection applications (col. 1, lines 17-34). Applications such as single and multi-photon fluorescence applications as well as fluorescent dye applications are well known. Absent some degree of criticality, the use of the suggested method

in such applications or combinations thereof would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the desired operational parameters.

Regarding claim 37, *Trulson* discloses that the microscope may include confocal detection (col. 6, lines 25-31).

Regarding claims 38-40, *Trulson* discloses that the method includes a scanning arrangement (col. 8, lines 60-68) wherein either the illumination source is scanned or a scan table is employed.

Regarding claim 41, *Carlson* discloses that the system may be used in a variety of optical detection applications (col. 1, lines 17-34). Applications employing nonconfocal detection are well known. Absent some degree of criticality, the use of the suggested method in such applications would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the desired operational parameters.

Regarding claim 42, *Trulson* discloses that the method includes a scanning arrangement (col. 8, lines 60-68).

Regarding claims 43 and 46, *Carlson* discloses that the system may be used in a variety of optical detection applications (col. 1, lines 17-34). Applications employing either descanned or non-descanned detection are well known. Absent some degree of criticality, the use of the suggested method in such applications would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the desired operational parameters.

Regarding claims 44 and 45, *Carlson* discloses that the system may be used in a variety of optical detection applications (col. 1, lines 17-34). Applications employing bright field

imaging and point imaging are well known. Absent some degree of criticality, the use of the suggested method in such applications would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the desired operational parameters.

Regarding claim 47, *Carlson* discloses that the system may be used in a variety of optical detection applications (col. 1, lines 17-34). Applications employing non-scanning, confocal or nonconfocal detection and bright field imaging or point imaging are well known. Absent some degree of criticality, the use of the suggested method in such applications would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the desired operational parameters.

Regarding claims 48-87, the apparatus recited according to claims 48-87 is suggested by the methods suggested by *Carlson* and *Trulson* as applied to claims 1-47 above and are rejected accordingly.

***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Albert J. Gagliardi whose telephone number is (703) 305-0417. The examiner can normally be reached on Monday thru Friday from 9 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (703) 308-4852. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Albert J. Gagliardi
Examiner
Art Unit 2878

AJG
April 14, 2003